



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,118	11/09/2001	Scott J. Daly	TAL/7146.126	5937

7590 12/04/2003

Timothy A. Long
Chernoff, Vilhauer, McClung & Stenzel, LLP
1600 ODS Tower
601 S.W. Second Avenue
Portland, OR 97204-3157

EXAMINER

MOYER, MICHAEL J

ART UNIT	PAPER NUMBER
----------	--------------

2675

3

DATE MAILED: 12/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/007,118

Applicant(s)

DALY, SCOTT J.

Examiner

Michael J. Moyer

Art Unit

2675

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 13-14 and 21-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Nagai et al. (hereinafter "Nagai"), US 2002/0135553 A1.

As pertaining to claim 1, Nagai teaches the method of improving the dynamic range by varying a luminance of a light source illuminating a displayed pixel in response to an intensity value of said pixel (paragraphs: 0024-0027, 0033-0038, 0065-0079, 0116-0122; fig. 18; abstract).

As pertaining to claim 2, Nagai teaches a) determining a luminance of said pixel from said intensity value and b) varying a luminance of said light source according to a relationship of said luminance of said pixel and said luminance of said light source (paragraphs: 0024-0027, 0033-0038, 0065-0079, 0116-0122; fig. 18). Claim 2 is dependent on claim 1 and is rejected on the same basis and what is stated above.

As pertaining to claim 3, Nagai teaches the relationship of the luminance of the pixel and light source is nonlinear (figs. 12-13). Claim 3 is dependent on claims 1-2 and is rejected on the same basis and what is stated above.

As pertaining to claim 13, Nagai teaches the step of varying a luminance of a plurality of light sources illuminating a plurality of displayed pixels substantially comprising a frame in a

sequence of video frame (paragraphs: 0024-0027, 0033-0038, 0051-0052, 0065-0079, 0116-0122, 0131-0133; figs. 3-4). Claim 13 is dependent on claim 1 and is rejected on the same basis and what is stated above.

As pertaining to claim 14, Nagai teaches a frame in sequence of video frames comprises the step of varying said luminance of said light sources for less than all frames of said sequence (paragraphs: 0024-0027, 0033-0038, 0051-0052, 0065-0079, 0116-0122, 0131-0133; figs. 3-4). Claim 14 is dependent on claims 1 and 13 and is rejected on the same basis and what is stated above.

As pertaining to claim 21, Nagai teaches a display comprising a plurality of light sources, at least one light source being controllable to output light at a luminance level independent of a luminance level of light output by another of said light source (paragraphs: 0024-0027, 0033-0038, 0065-0079, 0116-0122; figs. 1, 15 and 20).

As pertaining to claim 22, the light source driver controlling said luminance level of light output by said at least one light source according to a relationship of said luminance level of said output light and a data value for a display pixel (paragraphs: 0024-0027, 0033-0038, 0065-0079, 0116-0122; figs. 1, 15 and 20). Claim 22 is dependent on claim 21 and is rejected on the same basis and what is stated above.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-7, 15, and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai.

As pertaining to claim 4, Nagai discloses as depicted by figure 1 and figure 20, a polarizing conversion optical system 65 that is used to filter only P+S waves, thus allowing on the P waves to pass through. It is obvious that the polarizing conversion optical system 65 allows for filtering of the P wave, which would encompass the intensity values of the pixels (paragraphs: 0110-0112, 0254-0260). Claim 4 is dependent on claims 1-2 and is rejected on the same basis and what is stated above.

As pertaining to claim 5, Nagai discloses the relationship of the luminance of the pixel and light source is nonlinear (figs. 12-13). Claim 5 is dependent on claims 1-2 and 4 and is rejected on the same basis and what is stated above.

As pertaining to claim 6, and as shown in figure 20, Nagai discloses the conversion optical system 65, would also pertain to sampling of the filtered intensity value P at a spatial coordinate corresponding to the light source and thus displaying an image on the display 89 (paragraphs: 0110-0112, 0254-0260). Also, it would obvious that the conversion optical system can be broken down into two separate pieces, i.e., one being filter and the second being a spatial light modulator of some type. The spatial light modulator would also provide spatial coordinates from the light source. Claim 6 is dependent on claims 1-2 and 4 and is rejected on the same basis and what is stated above.

As pertaining to claim 7, it would be obvious that Nagai discloses the rescaling a sample of the filtered intensity value to reflect a nonlinear relationship between the luminance of the light source and intensity of the pixel (figs. 12-13). Claim 7 is dependent on claims 1-2, 4 and 6 and is rejected on the same basis and what is stated above.

As pertaining to independent claim 15, Nagai discloses determining a luminance of a pixel of an image from a data value for said pixel (paragraphs: 0024-0027, 0033-0038, 0065-0079, 0116-0122; fig. 18; abstract); filtering said luminance, Nagai discloses as depicted by

figure 1 and figure 20, a polarizing conversion optical system 65 that is used to filter only P+S waves, thus allowing on the P waves to pass through. It is obvious that the polarizing conversion optical system 65 allows for filtering of the P wave, which would encompass the intensity values of the pixels (paragraphs: 0110-0112, 0254-0260); determining a maximum of said filtered luminance for a plurality of pixels illuminated by a light element of a backlight (paragraphs: 0119, 0152); determining a statistical value of said filtered luminance for a plurality of pixels illuminated said light element and illuminating said light element according to a relationship of said maximum and said filtered luminance and said statistical value of said filtered luminance (paragraphs: 0110-0112, 0116-0122, 0254-0260).

As pertaining to independent claim 19, Nagai teaches a plurality of light source elements (paragraphs: 0024-0027, 0033-0038, 0065-0079, 0116-0122; figs. 1, 15 and 20); a light valve 65 or a polarizing conversion optical system 65 that is used to filter only P+S waves, thus allowing on the P waves to pass through (it is obvious that the polarizing conversion optical system 65 allows for filtering of the P wave, which would encompass the intensity values of the pixels) arranged for locally modulated transmittance of light from said light source elements, said locally modulated transmittance being responsive to a data value 51 of an image pixel (paragraphs: 0110-0112, 0254-0260; figs. 1, 15 and 20); and a light source controller 53 to modulate a luminance output of a light source element according to a relationship of said luminance output and data value of image pixel (paragraphs: 0024-0027, 0033-0038, 0065-0079, 0116-0122; figs. 1, 15 and 20).

As pertaining to claim 20, it would be obvious that some type of device, i.e., data processing unit or image processor or generator or controller etc., would have the capabilities to provide how much power is needed to drive each light source in order to display the luminance of pixels because it has the "information" or "instructions" regarding the image to be displayed,

furthermore, it would be obvious that the light element or light source driver would provide power to the light source elements. This is well known in the art and inherently known. Claim 20 is dependent on claim 19 and is rejected on the same basis and what is stated above.

3. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai as applied to claim 1 above, and further in view of Kabet et al. (hereinafter "Kabet"), US 6,590,561 B1.

As pertaining to claim 8, Nagai discloses what has previously been stated above. Nagai does disclose attenuating the luminance of the light source according to a relationship of said luminance and light source and a luminance of pixels (paragraphs: 0024-0027, 0033-0038, 0065-0079, 0116-0122; fig. 18; abstract).

As pertaining to claim 8, Nagai does not disclose the light source operates at a substantially maximum luminance if the luminance of at least one displayed pixel exceeds a threshold luminance.

As pertaining to claim 8, Kabel discloses a method in which a dimming operation occurs in which if it exceeds a threshold it, the light source, will not turn off. The flow chart of fig. 2 follows: The dimming routine begins when the controller 22 senses a request to dim the display module 16 as depicted in step 200 of FIG. 2. For example, an operator wishing to dim an image may press a down arrow or operate a slide bar on the user interface 24. The controller 22 then determines if the lowest threshold of the backlight 12 or a pre-selected threshold level has been reached as depicted in step 202. The lowest threshold of the back light 12 is preselected and may be any percentage of the full brightness of the back light 12. For example, through experimentation, it may be determined that the backlight 12 ceases to emit appreciable light at a power level of 25%. This 25% level may then be preset as the lowest threshold for the back light 12. If the lowest threshold of the back light 12 has not been reached, the program proceeds to step 204 where the controller 22 dims the back light 12 the

amount requested by the user interface 24 to reduce the amount of light passing through the display module 16. The routine then starts over to await further requests to dim the display module 16. If the controller 22 determines that the lowest or pre-selected threshold of the back light 12 has been reached in step 202, the routine proceeds to step 206 where the controller 22 determines whether the lowest threshold of the pixels has been reached. The lowest threshold for the pixels may be preselected and may be any percentage of the normal voltage levels for the pixels. For example, it may be determined that the pixels fail to operate properly if their voltage level is reduced by more than 75%. If so, 25% of the pixels' normal operating voltage may be preset as the lowest threshold for the pixels. If the lowest threshold for the pixels has been reached, the routine ceases dimming the display module 16. If, however, the lowest threshold for the pixels has not been reached in step 206, the routine proceeds to step 208 where the controller 22 proportionally adjusts the voltage level of all active pixels. The user interface 24 and the controller 22 may be configured to reduce the voltage levels delivered to the pixels in discrete steps or may provide an analog, infinite amount of reduction levels. It would be obvious that if this method can be used for dimming it further can be used to brighten a display.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the method of Kabel with that of Nagai.

The suggestion/motivation for doing so would have been to provide for a display that can operate at full on luminance and intensity when desired and when not. This allows for a user to see, as if, the display is at a better resolution, better contrast etc. Again, Kabel operates for dimming the display but it would be obvious that it can operate in the opposite direction and be used for brightening a display. Claim 8 is dependent on claims 1-2 and is rejected on the same basis and what is stated above.

4. **Claims 9-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai and Kabel as applied to claim 1 or 2 or 8 above, and further in view of Lim et al. (hereinafter "Lim"), US 2003/0057253 A1.

As pertaining to claim 9, Nagai and Kabel disclose what has previously been stated above.

As pertaining to claim 9, they do not disclose the step of attenuating the light source according to the relationship of said luminance of light source and a mean luminance of pixels.

As pertaining to claim 9, Lim discloses the attenuating the light source according to the relationship of said luminance of light source and a mean luminance of pixels (paragraphs: 0024, 0047 and abstract).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the method of attenuating of Lim with that of Nagai and Kabel.

The suggestion/motivation for doing so would have been to provide for better display that will have a different way of illuminating itself. This will allow for higher contrast and resolution and further improve the dynamic range. Claim 9 is dependent on claims 1-2 and 8 and is rejected on the same basis and what is stated above.

As pertaining to claim 10, Nagai discloses the step of attenuating a luminance of a plurality of light sources illuminating pixels comprising a frame in sequence of video frames (paragraphs: 0116-0119, 0131-0133; figs. 3-4). Claim 10 is dependent on claims 1-2 and 8-9 and is rejected on the same basis and what is stated above.

As pertaining to claim 11, Nagai discloses the step of attenuating said luminance of said light sources for a subset of frames of said sequence, said subset including less than all said frames of said sequence (paragraphs: 0016-0119, 0131-0133; figs. 3-4). Claim 11 is dependent on claims 1-2 and 8-10 and is rejected on the same basis and what is stated above.

As pertaining to claim 12, it would be obvious that Nagai discloses that the plurality of pixels comprises at least two contiguous pixels (paragraphs: 0016-0119, 0131-0133; figs. 3-4). Claim 12 is dependent on claims 1-2 and 8-9 and is rejected on the same basis and what is stated above.

5. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai as applied to claim 15 above, and further in view of Lim.

As pertaining to claim 16, Nagai disclose what has previously been stated above.

As pertaining to claim 16, Nagai does not disclose the statistical value of said luminance comprises a mean luminance of plurality of pixels.

As pertaining to claim 16, Lim discloses the statistical value of said luminance comprises a mean luminance of plurality of pixels. (paragraphs: 0024, 0047 and abstract).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the method of Lim with that of Nagai.

The suggestion/motivation for doing so would have been to provide for better display that will have a different way of illuminating itself. This will allow for higher contrast and resolution and further improve the dynamic range. Claim 16 is dependent on claim 15 and is rejected on the same basis and what is stated above.

6. **Claims 17-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai and Lim as applied to claim 1 above, and further in view of Kabet.

As pertaining to claim 17, Nagai and Lim disclose what has previously been stated above. Nagai does disclose attenuating the luminance of the light source according to a relationship of said luminance and light source and a luminance of pixels (paragraphs: 0024-0027, 0033-0038, 0065-0079, 0116-0122; fig. 18; abstract).

As pertaining to claim 17, they do not disclose the light source operates at a substantially maximum luminance if the luminance of at least one displayed pixel exceeds a threshold luminance.

As pertaining to claim 17, Kabel discloses a method in which a dimming operation occurs in which if it exceeds a threshold it, the light source, will not turn off. The flow chart of fig. 2 follows: The dimming routine begins when the controller 22 senses a request to dim the display module 16 as depicted in step 200 of FIG. 2. For example, an operator wishing to dim an image may press a down arrow or operate a slide bar on the user interface 24. The controller 22 then determines if the lowest threshold of the backlight 12 or a pre-selected threshold level has been reached as depicted in step 202. The lowest threshold of the back light 12 is preselected and may be any percentage of the full brightness of the back light 12. For example, through experimentation, it may be determined that the backlight 12 ceases to emit appreciable light at a power level of 25%. This 25% level may then be preset as the lowest threshold for the back light 12. If the lowest threshold of the back light 12 has not been reached, the program proceeds to step 204 where the controller 22 dims the back light 12 the amount requested by the user interface 24 to reduce the amount of light passing through the display module 16. The routine then starts over to await further requests to dim the display module 16. If the controller 22 determines that the lowest or pre-selected threshold of the back light 12 has been reached in step 202, the routine proceeds to step 206 where the controller 22 determines whether the lowest threshold of the pixels has been reached. The lowest threshold for the pixels may be preselected and may be any percentage of the normal voltage levels for the pixels. For example, it may be determined that the pixels fail to operate properly if their voltage level is reduced by more than 75%. If so, 25% of the pixels' normal operating voltage may be preset as the lowest threshold for the pixels. If the lowest threshold for the pixels has

been reached, the routine ceases dimming the display module 16. If, however, the lowest threshold for the pixels has not been reached in step 206, the routine proceeds to step 208 where the controller 22 proportionally adjusts the voltage level of all active pixels. The user interface 24 and the controller 22 may be configured to reduce the voltage levels delivered to the pixels in discrete steps or may provide an analog, infinite amount of reduction levels. It would be obvious that if this method can be used for dimming it further can be used to brighten a display.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the method of Kabel with that of Nagai and Lim.

The suggestion/motivation for doing so would have been to provide for a display that can operate at full on luminance and intensity when desired and when not. This allows for a user to see, as if, the display is at a better resolution, better contrast etc. Again, Kabel operates for dimming the display but it would be obvious that it can operate in the opposite direction and be used for brightening a display. Claim 17 is dependent on claims 15-16 and is rejected on the same basis and what is stated above.

As pertaining to claim 18, Nagai discloses the statistical value of luminance of plurality of pixels and luminance level of light sources is nonlinear (figs. 12-13, 18). Claim 18 is dependent on claims 15-17 and is rejected on the same basis and what is stated above.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) Fuller, US 2002/0171617 A1. Fuller teaches a display arrangement with backlight means.

b) Conover et al., US 6,414,664 B1. Conover teaches a method of and apparatus for controlling contrast of liquid crystal displays while receiving large dynamic range video.

c) Walker, US 6,359,662. Walker teaches a method and system for compensating for defects in a multi-light valve display system.

d) Someya et al., US 6,300,931 B1. Someya teaches liquid crystal display.

e) Motomura et al., US 6,111,559. Motomura teaches a liquid crystal display device.

f) Akimoto et al., US 6,008,929. Akimoto teaches an image displaying apparatus and method.

g) Herman, US 5,394,195. Herman teaches a method and apparatus for performing dynamic gamma contrast control.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Michael J. Moyer** whose telephone number is **(703) 305-2099**. The examiner can normally be reached Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Steven Saras**, can be reached at **(703) 305-9720**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to: (703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the **Technology Center 2600 Customer Service Office** whose telephone number is **(703) 306-0377**.

MJM
November 29, 2003



STEVEN SARAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Michael J. Moyer
Examiner
Art Unit 2675